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AGO ltr 29 Apr 1980

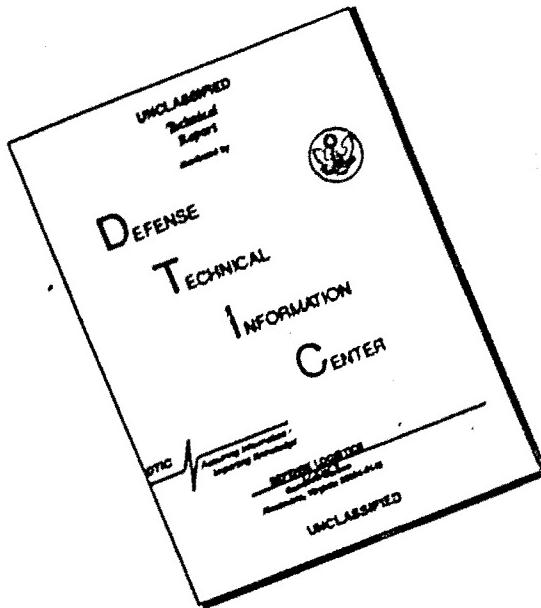
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DEPARTMENT OF THE ARMY
OFFICE OF THE ADJUTANT GENERAL
WASHINGTON, D.C. 20310

IN REPLY REFER TO

AGDA (M) (2 Feb 70) FOR OT UT 694294

4 February 1970

SUBJECT: Operational Report - Lessons Learned, Headquarters, 31st Engineer Battalion, Period Ending 31 October 1969

866092

AD

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2. Information contained in this report is provided to insure appropriate benefits in the future from lessons learned during current operations and may be adapted for use in developing training material.

BY ORDER OF THE SECRETARY OF THE ARMY:

Kenneth G. Wickham

KENNETH G. WICKHAM
Major General, USA
The Adjutant General

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DEPARTMENT OF THE ARMY
HEADQUARTERS, 31ST ENGINEER BATTALION (C)(A)
APO San Francisco 96490

EEA-3

13 November 1969

SUBJECT: Operational Report Lessons Learned - HQ, 31st Engineer Battalion (C)(A) for the period ending 31 Oct 1969 RCS CSFOR-65 (R2)

THRU: Commanding Officer
79th Engineer Group (Const)
ATTN: EEA-3
APO 96491

Commanding General
20th Engineer Brigade
ATTN: AVSI-OS
APO 96491

Commanding General
US Army Vietnam
ATTN: AVIIGJ-DST
APO 96375

TO: Commander-in-Chief
US Army Pacific
ATTN: GPOP-YT
APO 96558

FOR UT UT
694294
Inclosure

1

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SECTION I: OPERATIONS: SIGNIFICANT ACTIVITIES:

a. Command: LTC George N. Andrews continued as Battalion Commander.

b. Personnel, Administration, Morale, and Discipline:

(1) At the end of the reporting period the strength of the battalion, including attached units, was 94% of that authorized. The monthly strength figures for the quarter are shown below:

	<u>STRENGTH</u>	<u>OFF</u>	<u>WO</u>	<u>EM</u>	<u>TOTAL</u>
31 Aug 69	AUTH	42	4	948	994
	ASGD	34	4	960	998
30 Sep 69	AUTH	42	4	948	994
	ASGD	42	4	968	1014
31 Oct 69	AUTH	42	4	948	994
	ASGD	40	4	890	934

(2) Shortages by MOS in the Battalion this reporting period are indicated in the following charts:

<u>PMOS</u>	<u>AUTH</u>	<u>ASGD(AUG)</u>	<u>ASGD(SEP)</u>	<u>ASGD(OCT)</u>
12B40	88	63	59	56
12Z50	7	6	7	5
63C40	?	4	4	4
94B40	6	5	3	3

(3) The following charts list losses and gains during the quarter:

<u>LOSSES</u>	<u>OFF</u>	<u>WO</u>	<u>EM</u>	<u>AGG</u>
CONUS Rotation	14	0	122	136
Infusion	0	0	0	0
Miscellaneous	1	0	76	77
TOTAL	15	0	198	213

<u>GAINS</u>	<u>OFF</u>	<u>WO</u>	<u>EM</u>	<u>AGG</u>
CONUS Replacements	15	0	42	57
Infusion	0	0	0	0
In-country Rsgs	5	0	23	28
TOTAL	20	0	115	135

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(4) The following awards were presented to 31st Engineer Battalion personnel:

<u>MEDALS</u>	<u>OFF</u>	<u>WO</u>	<u>EM</u>	<u>TOTAL</u>
Silver Star	1	0	1	2
Bronze Star	15	1	12	28
Bronze Star (valor)	0	0	5	5
Army Commendation	3	0	26	29
Purple Heart	1	0	13	14

(5) The following enlisted promotions were made to the grade indicated:

	<u>E4</u>	<u>E5</u>	<u>E6</u>	<u>E7</u>	<u>E8</u>	<u>E9</u>	<u>TOTAL</u>
Aug	93	63	3	0	0	0	159
Sep	39	22	2	0	0	0	63
Oct	17	24	0	0	0	0	41

(6) Disciplinary Cases:

	<u>ART 15</u>	<u>SJM</u>	<u>SPCM</u>	<u>GEMM</u>	<u>TOTAL</u>
August	12	0	2	0	14
September	29	0	4	0	33
October	25	0	2	0	27

(7) Reenlistment during this period was:

	<u>AUGUST</u>	<u>SEPTEMBER</u>	<u>OCTOBER</u>
First Term	2	5	1
Career	2	0	2

(8) Allocations for R&R received and filled by personnel of the Battalion are shown below:

<u>LOCATION</u>	<u>AUG</u>	<u>SEP</u>	<u>OCT</u>	<u>TOTAL</u>
Australia	14	12	12	38
Bangkok	13	12	10	35
Hawaii	18	15	15	48
Manila	1	2	1	4
Taipei	6	5	7	18
Singapore	2	4	3	9
Tokyo	3	4	3	10
Hong Kong	7	6	12	25
Penang	0	2	0	2
SUB-TOTAL	64	62	63	189

<u>LOCATION</u>	<u>AUG</u>	<u>SEP</u>	<u>OCT</u>	<u>TOTAL</u>
In-Country	<u>5</u>	<u>4</u>	<u>5</u>	<u>14</u>
TOTAL	<u>69</u>	<u>66</u>	<u>68</u>	<u>203</u>

(9) 105 personnel extended their foreign service tours:

<u>OFF</u>	<u>WO</u>	<u>EN</u>	<u>TOTAL</u>
<u>0</u>	<u>0</u>	<u>105</u>	<u>105</u>

c. Intelligence and Counterintelligence:

(1) All intelligence data is received from G2 1st Cav Div (AM) and IIEFV intelligence summaries.

(2) During this quarter the S-2 Section's activities consisted of a daily minesweep of LTL-1A from Phuoc Vinh to the Song Be Bridge. Reconnaissance was made for suitable sources of laterite to fulfill the 31st Engineer Battalion earthwork requirements. In addition, the S-2 section conducted security inspections within the Battalion and provided security for convoys and job sites in the vicinity of Phuoc Vinh.

d. Operations and Training:

(1) During this reporting period the Battalion's effort was utilized in the following areas:

Combat Support	10%
Operational Support	30%
Base Construction	40%
Lines of Communication (LOC)	1%
Maintenance	13%
Security	6%

(2) Base construction effort has increased this quarter due to greater effort on MACV projects and the construction of helicopter hangers for decentralized aircraft maintenance for the 1st Air Cavalry Division.

(3) The 31st Engineer Battalion places great emphasis on good construction management techniques. Critical paths and main task schedules are minimum requirements for all project work involving more than one platoon week's effort. Quality control is emphasized throughout the chain of command.

(4) Despite the intense project workload of the 31st Engineer Battalion, all training requirements were satisfied. Additional training was given in the field of preventive maintenance in an effort to attain better maintenance procedures. All replacements to the 31st continue to receive a three day orientation training course at the 1st ACD training center in Bien Hoa. During this reporting period the Battalion was engaged in operations for a total of 90 days and training for 2 days.

e. Maintenance and Logistics:

(1) Maintenance: This quarter, the 31st Engineer Battalion maintained an average of 12.9% deadline for critical equipment and 11.2% overall, as shown below:

	<u>CRITICAL</u>	<u>OVERALL</u>
August	9.8%	8.5%
September	13.3%	10.3%
October	15.8%	14.9%

(2) Supply: There were only minor problems in the supply system this period. Construction materials were provided on a timely basis with few exceptions. The most critical shortages during this period were cement and plumbing items. Major materials issued during this period were:

<u>MATERIAL</u>	<u>QUANTITY</u>
4x12 lumber	34,130 BF
3x lumber	24,659 BF
2x4 lumber	53,776 BF
Cement	18,169 BGS

f. Command Management:

(1) During this reporting period the 31st Engineer Battalion has undertaken several large scale operations. One project, involving most of the Battalion, consisted of a combat support mission for emergency repairs to Route LTL-1A, the MSR for the 1st ACB at Phuoc Vinh which had been heavily damaged by rain, including complete washout in some areas. By exercising good command management techniques the mission was accomplished and the road reopened in minimum time. All equipment was pooled and each company was designated a specific task. One company was responsible for all haul requirements, another devoted its efforts to prefabrication of culvert and a third concentrated on manual work on the site. The Light Equipment Company supervised all equipment and pit operations. Team work such as this has added immeasurably to the "Esprit de Corps" for the 31st Engineer Battalion. Other missions requiring the bulk of this unit's resources have been four convoys to Song Be in support of the expansion of FSB Buttons and the MACV Advisory Housing Project. The route to Song Be passes through very insecure areas. Initially, each convoy had to be as large as possible to take maximum advantage of the available security. As a result of this unit's efforts to open the road, convoys are now run on a frequent basis by many other units. The organization of the convoy, as well as the immediate command and control and coordination with 1st ACB security forces, was provided by the 31st. Experience gained by officers and men of the 31st from such Battalion-sized missions is invaluable.

(2) Summary of Major Construction Projects:

<u>TITLE</u>	<u>SCOPE</u>
OQO Hangars	Two 80x144 hangars were disassembled at Dong Tam and reassembled at Phuoc Vinh. One 40x96 Pascoo hangar was erected. Project complete.
QL-13	One platoon from 557th maintained this road from Chon Thanh to Quan Loi throughout the reporting period.
1/9 Mess Hall	Two 40x96 Pascoo buildings were erected for a mess hall at Phuoc Vinh.
371st TOC	One 40x48 bunker was completed.
MACV Song Be	Work continued throughout the period on extensive living and working facilities.
MACV Duc Phong	Harden billet area with electrical and plumbing facilities was completed.
PSB Buttons	Work started in October on extensive base facilities for brigade headquarters area.
LTL-1A	Battalion-sized effort committed for five days to open a severely damaged MSR.

(3) Members of this battalion feel that the keynote to this unit's success has been responsiveness. The bulk of the battalion's effort is allocated to support of the 1st Air Cavalry Division. In order to keep pace with this vibrant, fast-moving Combat Division and lend proper engineer support, operations have to be flexible and rapid. This attitude has been inculcated throughout the ranks. As a matter of routine, combat support missions are often assigned which require immediate reaction. Good planning, swift mobilization and rapid execution have done much to create a good image of this unit throughout the area of operations.

(4) Command management is hampered due to lack of necessary aircraft support. The area of operations for the 31st Engineer Battalion is extensive (approximately 100km x 100km). The majority of the project sites are in remote insecure areas which are inaccessible by roads. Therefore, some type of aircraft is required for command and control on a continual basis. Additionally, present plans in the 79th Group call for an intensive program of upgrading forward airfields. It is expected that the 31st will be tasked for the bulk of this work. Without increased aircraft support, the program will be in danger of unnecessary delays due to a paucity of command and staff visits by this headquarters as well as normal resupply. The problem has been recognized by higher headquarters, however, the availability of aircraft remains virtually unchanged.

g. Civil Affairs:

(1) The Battalion continued its program of Medcaps in the villages surrounding Phuoc Vinh. The Medcaps are held approximately once every other week with an average of 30 patients per visit. Each Medcap employs the Battalion Surgeon, 2-3 medics and 4 EM for security.

(2) The Battalion was able to utilize dump trucks in a "back-haul" from a convoy to Song Be to transport 75 tons of rice in support of the MACV Advisory program. The rice was delivered to Dong Xoai from the Phuoc Binh Province in Song Be.

h. Civilian Personnel Affairs: The continued use of local nationals for prefab operations and KP has been without incident. Daily Hires have been utilized as the need requires for use in filling sandbags, grass cutting, etc. This operation has also been conducted without incident.

i. Headquarters & Headquarters Company, 31st Engineer Battalion (C)(A):

(1) Command: Cpt. Michael A. Smith replaced 1st Lt. James C. Hamm as Company Commander on 1 Sep 69.

(2) Operations: Headquarters Company continued its mission to support the line companies with heavy equipment and maintenance assistance. The OOD hangar construction projects in Phuoc Vinh depended a great deal on the crane support from the Heavy Equipment Section. During emergency repair work on LTL-1A the equipment of HQ Company provided the necessary support to reopen this MSR for the 1st Air Cavalry Division units in Phuoc Vinh.

j. Company A, 31st Engineer Battalion (C)(A):

(1) Command: 1st Lt. Robert P. Mackey replaced 1st Lt. Terry Simmons as Company Commander on 3 Aug 69. Cpt. Thomas A. Sheehy replaced Lt. Mackey on 10 Aug 69.

(2) Operations: A Company's efforts were directed towards project work at Duc Phong MACV, Dong Xoai, and Phuoc Vinh. One platoon remained at Duc Phong until late October for construction of MACV Housing consisting of a 20x60 hardened billet complete with latrine facilities. Duc Phong airstrip was also repaired at this time. At Dong Xoai Special Forces Camp, the airfield was completely regraded, compacted and paved in support of the IIFFV Forward Airfield Maintenance Program. Phuoc Vinh was the site for construction of 20 UH-1 Revetments, a 40x48 Radio Research TOC, and a 40'x100' Maintenance hangar; all in support of the 1st ACD. A Company is presently at work on an air traffic control tower at Phuoc Vinh, as well as erection of a 60 ft. steel tower and a major repair of the airfield taxiway.

k. Company B, 31st Engineer Battalion:

(1) Command: Cpt. Andrew Mueller continued as Company Commander.

(2) Operations: Bravo Company, with its headquarters at Quan Loi, completed the ASP in Quan Loi and the repair of An Loc Bridge on QL 303. MER consisting of showers, latrines, and hardstands was accomplished for the 1/9 and 2/20 of the 1st ACB at Quan Loi. The third platoon remained at Song Bo where construction continues on the MACV Housing project. Presently at Song Bo MACV, the underground TOC and BOQ are complete. The 20x100 two story EM billet, Officers' latrine, EM and Officer septic tanks and drain fields, medical bunker, and maintenance building are all under construction and progressing on schedule towards a 31 Dec completion date.

During the month of October, it was necessary to reinforce the MACV project with added effort and furnish a platoon in support of the expansion of FSB Buttons in the vicinity of Song Bo. Therefore, the entire company was moved to Song Bo via C-130 sorties and one convoy on 7 October.

Presently, two platoons of Bravo Company are at work on the MACV Housing project while the third remains under OPCON of Delta Company for work at LZ Buttons.

l. Company C, 31st Engineer Battalion (C)(A):

(1) Command: Cpt. Karl R. Woodruff continued as Company Commander.

(2) Operations: During this reporting period, Charlie Company's efforts were devoted to construction of two 80x144 aircraft maintenance hangars and a mess hall composed of two 40x100 Pascoe Buildings, all in support of the 1st ACB in Phuoc Vinh. The two aircraft hangars were first dismantled in Dong Tam, then convoyed to Phuoc Vinh, where they were re-erected in support of Project QQ, the decentralized aircraft maintenance concept.

The Mess Hall was composed of two Pascoe buildings (40x100) erected adjacent to one another with a connecting concrete slab. The slabs, building erection and all electrical was constructed by C Company for the 1st Squadron, 9th Cavalry of the 1st Air Cavalry Division.

m. Company D, 31st Engineer Battalion (C)(A):

(1) Command: Cpt. Christos A. Dovas continued as Company Commander.

(2) Operations: The first platoon of Delta Company finished its work repairing Tonlo Chan Airstrip by early September. The runway was patched using soil-cement stabilization and then penetrifined. At Phuoc Vinh the remainder of the company was at work placing concrete pads for mess hall, showers and latrines for the 227th Helicopter Battalion of the 1st Air Cavalry Division. On 10 Aug, the second platoon moved to Blackhorse where it remained until 19 August, dismantling 9 Adams Huts for movement to Quan Loi. The huts were transported to Quan

Loi where Bravo Company was in the process of placing concrete slabs for foundations. The A-frames were then reassembled and the project was completed on 22 Sep 69.

Early in October, Delta Company was alerted for a major construction effort at FSB Buttons. On 5 October, a major convoy consisting of 200 engineer vehicles was assembled and the second and third platoons moved out for FSB Buttons with a major portion of the lumber, sand, and aggregate required for the project. The scope of this project consists of a 750 Ton Ammunition Supply Point, 15 four-head showers, 20 four-hole latrines, 3 TOC's, a medical bunker, 2 AH-1G helicopter repair points, CH-47 and UH-1 refuel areas, 7 mess hall pads, approximately 81,000 square yards of haristans, 7500 linear feet of perimeter berm, 5 guard towers and 12,000 linear feet of roadway. The required completion date is 31 Dec 69. At the end of this reporting period the project is 20% complete, on schedule, and moving smoothly.

Throughout this period, Delta Company provided Airmobile Dozer Support (OS and D2) at the following locations: FSB Frieda, FSB Sedgwick, Xuan Loc, Duc Phong, and four other classified locations.

n. 557th Light Equipment Company, 31st Engineer Battalion (C)(A):

(1) Command: 1st Lt. John A. O'Brien replaced Cpt. James P. Reynolds as Company Commander on 18 Oct 69.

(2) Operations: The 557th LE Company has provided the 31st Engineer Battalion with the equipment necessary to fulfill our massive earthwork requirements. During the period 20 Aug 69 to 31 Oct 69, the first platoon remained at Thunder III FSB on a combat support basis to repair and maintain Route QL-13 from Chon Thanh to Quan Loi. As a result of their efforts, this road never failed to pass traffic in the heaviest part of the rainy season. In Phuoc Vinh, support was provided for earthwork on a vehicle POL point under construction by the 31st Engineer Battalion. The second platoon was located at Quan Loi in support of Bravo Company where maintenance haristans were constructed for 1st ACD MER.

Additional missions of the 557th LE Co have been the operation of a laterite pit in Phuoc Vinh for fill requirements as well as the operation of a concrete batch plant utilizing MCA-LOC Transit-Mix Trucks. To date this plant has produced approximately 1000 cu of concrete since beginning operation on 2 Sep 69.

At the present the 557th has one platoon at FSB Buttons in support of the 2nd Brigade of the 1st ACD and their expansion of this site. Another platoon is preparing to move to FSB Buttons to reinforce the horizontal effort there in early November. The remainder of the 557th will continue support missions in Phuoc Vinh on the helicopter refuel site, vehicle POL point and the repair of the Phuoc Vinh Taxiway.

SECTION II: LESSONS LEARNED: COMMANDERS OBSERVATION, EVALUATION, AND RECOMMENDATIONS:

a. Personnel: None

b. Intelligence: None

c. Operations:

(1) Gun Pad Failures:

(a) Observation: Repeated failures of heavy (175 & 155 mm) Gun Pads.

(b) Evaluation: Upon investigation it was found in all cases that the failures occurred in pads constructed with a laterite fill over 6" minus rock for use in absorbing the recoil. The laterite had washed through the voids and formed a cohesive mass which is not effective in absorbing the recoil.

(c) Recommendation: Use well washed 6" minus rock only, without laterite, for the construction of heavy gun pads. This size rock provides a sufficient void ratio to allow for absorption of the recoil.

(2) 16s Concrete Mixer:

(a) Observation: Damaged water pumps and gear boxes on the rear of the 16s mixer.

(b) Evaluation: Frequently, a bucket loader is employed in conjunction with a 16s mixer for carrying the concrete to a nearby site for placement. It was noted that the teeth of the bucket often bumped the water pump and gear boxes of the 16s mixer due to the limited visibility of the operator when undergoing this operation.

(c) Recommendation: For protection of the 16s, weld a guard frame of angle iron around the gear box and water pump.

(3) Revetment Failures:

(a) Observation: Failure of unsymmetrical, trapezoidal cross section, revetments.

(b) Evaluation: Failure of earth fill revetments of unsymmetrical cross section is due to the location of the resultant force vector which does not pass through the center of the base. The result is a greater load on one area of the foundation soil and therefore, a proportionately greater consolidation and hence, more settlement on one edge yielding a top heavy structure (See sketch).

(c) Recommendation: All free standing revetments should be symmetrical in cross section. If a nonsymmetrical cross section revetment is employed, a

concrete foundation should be used to provide the necessary bearing surface,

(4) Field Expedient Crane:

(a) Observation: At a remote location a crane was necessary to erect a 36 ft. steel tower.

(b) Evaluation: A Field Expedient was necessary in order to have construction proceed. The only equipment available on site was a scoop loader.

(c) Recommendation: As an expedient, a 6x12 wooden member about 20 ft. long was clamped in the jaws of the bucket loader. The middle of the member was guyed back to the bucket with chains. A block and tackle was rigged on the end of the boom. The maneuverable hydraulics of the loader enabled adequate mobility to lift members of the tower into place (See sketch).

d. Organization:

(1) Observation: The battalion utilized a great deal of effort in support of airmobile operations.

(2) Evaluation: Airmobile equipment support is greatly hampered due to a lack of qualified personnel, repair parts and replacement items.

(3) Recommendation: The airmobile equipment should be eliminated from this battalion and pooled at a higher level. Provision for continued use of this equipment should be made in a specially designed organization with adequate parts and replacement support.

e. Training: None

f. Logistics: None

g. Communication: None

h. Material: None

i. Other: None

GEORGE N. ANDREWS
LTC, CE
Commanding

2 Incl
1. Sketch
2. Organization Chart

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EE-CC (13 Nov 69) 1st Ind

SUBJECT: Operational Report of 31st Engineer Battalion (CBT) for
Period Ending 31 October 1969

DA, HEADQUARTERS, 79TH ENGINEER GROUP, APO 96491 20 November 1969

TO: Commanding Officer, 20th Engineer Brigade, ATTN: AVBI-CS, APO 96491

1. The Operational Report of the 31st Engineer Battalion has been reviewed and additional comments are as follows:

a. Reference Section I, paragraph f-(4): I concur with LTC Andrews' assessment of the inability of the 20th Brigade Aviation to satisfy the 31st Battalion's command-and-control requirements. However, through our recently adopted program of more effectively managing this critical resource, I detect a certain amount of improvement. Nevertheless, the problem has not yet been completely solved to my satisfaction.

b. Reference Section II: I heartily indorse LTC Andrews' comments on gun pad failures, on modifying the 16-S mixer, on the use of a bucket loader as a field-expedient crane and on the consolidation of all excess airmobile equipment in a central maintenance pool.

2. This report is considered to be an adequate summary of the battalion's operational experience during the report period.

A. L. Wright
A. L. WRIGHT
COL, CIE
Commanding

CP:

CC, 31st Engr Bn

AVBI-OS (13 Nov 69) 2nd Ind

SUBJECT: Operational Report of 31st Engineer Battalion (CBT) for Period Ending 31 October 1969

DA, HEADQUARTERS, 20TH ENGINEER BRIGADE, APO 96491 **07 DEC 1969**

TO: Commanding General, United States Army Vietnam, ATTN: AVH3C-OST, APO 96375

1. Submitted in accordance with USARV Regulation 525-15, dated 13 April 1968.

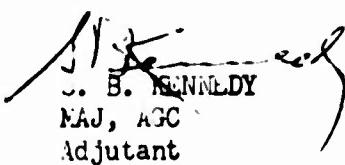
2. This headquarters concurs with the submitted report with the following comments:

a. Section I, paragraph f(4), page 5: Unit aviation support is provided based on Group requests and availability of assets. Priorities are established by the Group headquarters. Due to the present configuration of the 31st Engineer Battalion, it has been suggested that fixed wing aircraft be utilized. Aviation support for the airfield upgrade program has been considered and will be requested through IIFVV when the program is initiated and actual requirements are determined. Aircraft availability should greatly improve upon receipt of the new OH-58A aircraft by March 1970.

b. Section II, paragraph c(4), page 10: From the diagram at Inclosure 1, it is not clear what the forces on the bucket parts and hydraulic ram brackets would be when even a moderate load is suspended at a distance of 15 to 20 feet out on the pole. The weight of the pole itself must also be considered. It appears that continuous use of this field expedient would result in maintenance problems with scoop loaders.

c. Section II, paragraph d, page 10: This matter is currently under study at this headquarters. Several proposals are under consideration, including MTOE action and airmobile equipment pool support.

FOR THE COMMANDER:


Lt. Col. B. KENNEDY
MAJ, AGC
Adjutant

2CF:

CQ, 79th Engr Cpt
CQ, 31st Engr Bn

AVHGC-DST (13 Nov 69) 3d Ind

SUBJECT: Operational Report Lessons Learned-HQ, 31st Engineer Battalion (C)(A)
for the period ending 31 Oct 1969 RCS CSFOR-65 (R2)

HEADQUARTERS, UNITED STATES ARMY, VIETNAM, APO San Francisco 96375 31 DEC 1969

TO: Commander in Chief, United States Army, Pacific, ATTN: GPOP-DT,
APO 96558

1. This headquarters has reviewed the Operational Report-Lessons Learned
for the quarterly period ending 31 October 1969 from Headquarters, 31st
Engineer Battalion (C)(A).

2. Comments follow:

a. Reference item concerning "16S Concrete Mixer", page 9, paragraph
c(2); nonconcur. This is an unauthorized modification. A guide should
be used to direct equipment when the operator's vision is limited. The
16S mixer operator should perform this function. Additionally, a wheel
stop should be employed to limit the approach of the bucket loader.
Recommended equipment modifications should be submitted in accordance
with paragraph 3-7.4, TM 38-750.

b. Reference item concerning "Field Expedient Crane", page 10,
paragraph c(4) and 2d Indorsement, paragraph 2b; concur. This will
provide an emergency field expedient. Close supervision must be exercised
and the allowable load determined considering the length and condition
of the boom, the angle of the boom, and the change of center of gravity
of the loader. Continuous judicious use should not cause increased
maintenance problems with the bucket loader.

FOR THE COMMANDER:


B. A. GOODWIN
MAJ, AGC
Assistant Adjutant General

Cy furn:
31st Engr Bn
20th Engr Bde

GPOP-DT (13 Nov 69) 4th Ind

SUBJECT: Operational Report of HQ, 31st Engineer Battalion (C) (A)
for Period Ending 31 October 1969, RCS CSPOR-65 (R2)

HQ, US Army, Pacific, APO San Francisco 96558 15 JAN 70

TO: Assistant Chief of Staff for Force Development, Department of the
Army, Washington, D. C. 20310

This headquarters concurs in subject report as indorsed.

FOR THE COMMANDER IN CHIEF:

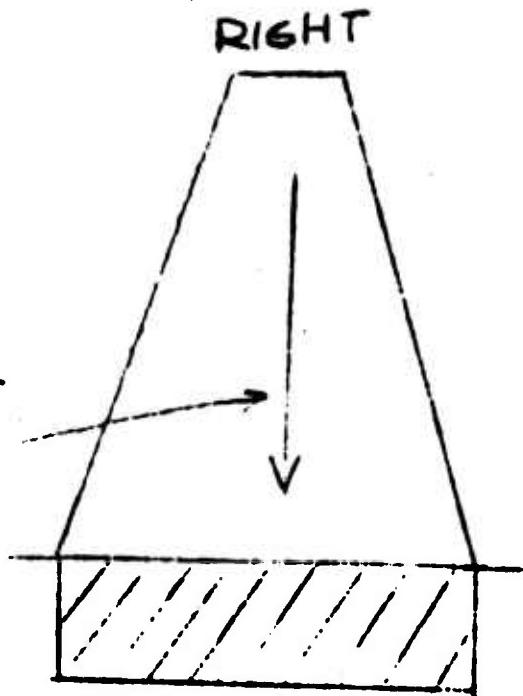


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CPT. AGC
ASST AG



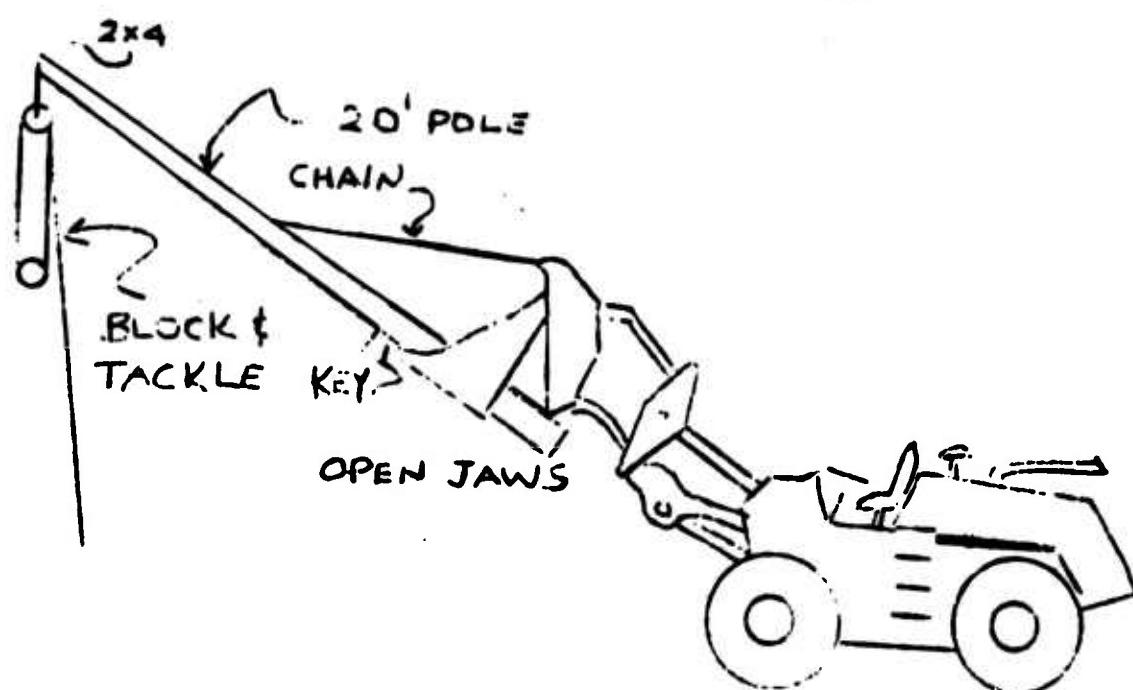
SOIL REACTION
DIAGRAM

RESULTANT
OF FORCES



SOIL REACTION
DIAGRAM

REVETMENT FAILURE



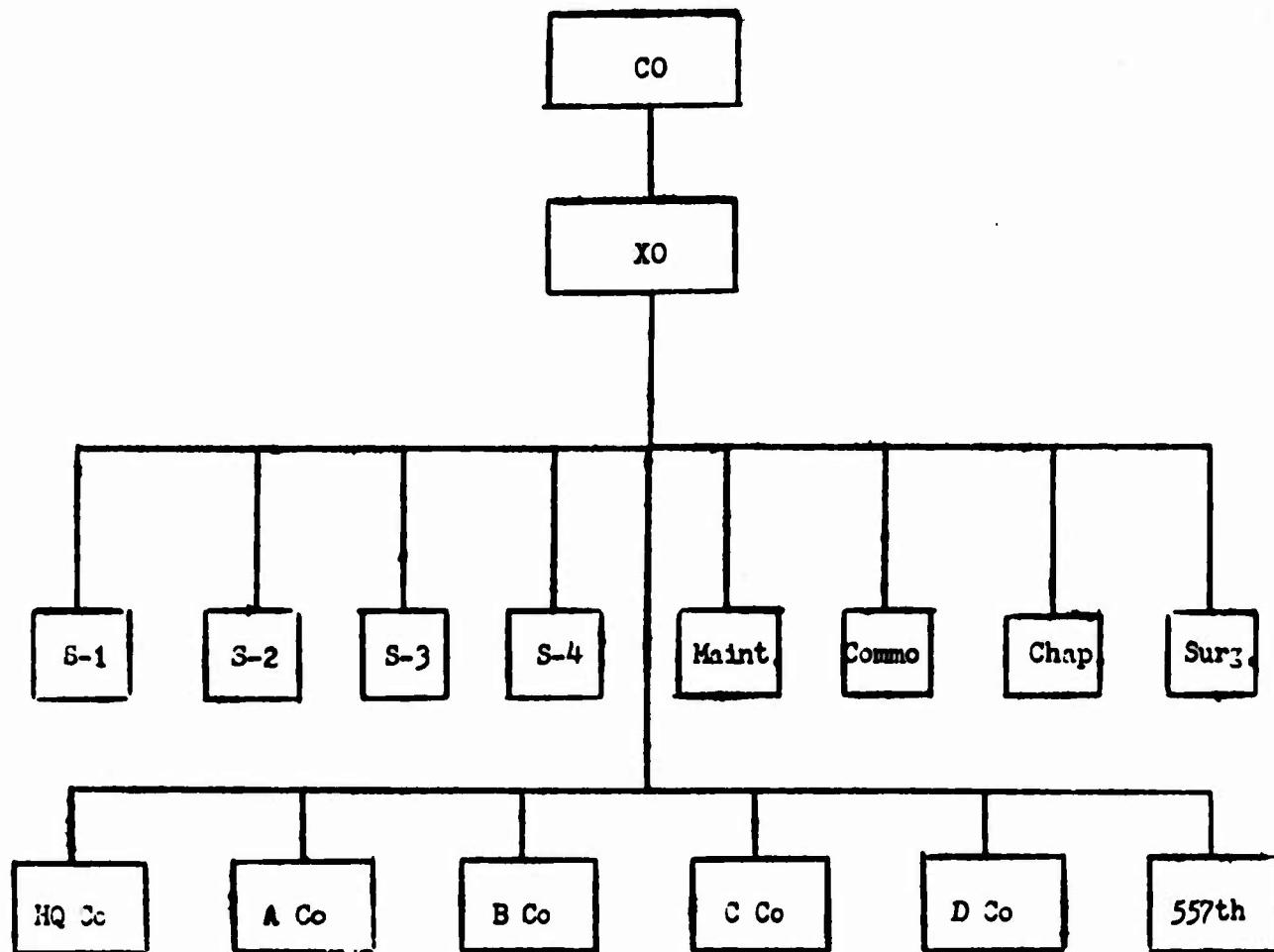
FIELD EXPEDIENT CRANE

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Security Classification

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate author)		2a. REPORT SECURITY CLASSIFICATION FOR OFFICIAL USE ONLY
HQ, OACSFOR, DA, Washington, D.C. 20310		2b. GROUP
3. REPORT TITLE		
Operational Report - Lessons Learned, HQ, 31st Engineer Battalion		
4. DESCRIPTIVE NOTES (Type of report and inclusive dates) Experiences of unit engaged in counterinsurgency operations, 1 Aug 69 to 31 Oct 69.		
5. AUTHOR(S) (First name, middle initial, last name) CO, 31st Engineer Battalion		
6. REPORT DATE 13 November 1969	7a. TOTAL NO. OF PAGES 20	7b. NO. OF REFS
8a. CONTRACT OR GRANT NO.	8b. ORIGINATOR'S REPORT NUMBER(S) 694294	
b. PROJECT NO N/A	9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)	
c.		
d.		
10. DISTRIBUTION STATEMENT		
11. SUPPLEMENTARY NOTES N/A	12. SPONSORING MILITARY ACTIVITY OACSFOR, DA, Washington, D.C. 20310	
13. ABSTRACT		